THE ASTROPHYSICAL JOURNAL CONTENTS OF VOLUME 514, PART 1

1999 APRIL 10, NUMBER 1

	Page
THE HUBBLE SPACE TELESCOPE KEY PROJECT ON THE EXTRAGALACTIC DISTANCE SCALE. XIV. THE CEPHEIDS IN NGC 1365	1
N. A. Silbermann, Paul Harding, Laura Ferrarese, Peter B. Stetson, Barry F. Madore, Robert C. Kennicutt, Jr., Wendy L. Freedman, Jeremy R. Mould, Fabio Bresolin, Holland Ford, Brad K. Gibson, John A. Graham, Mingsheng Han, John G. Hoessel, Robert J. Hill, John Huchra, Shaun M. G. Hughes, Garth D. Illingworth, Dan Kelson, Lucas Macri, Randy Phelps, Daya Rawson, Shoko Sakai, & Anne Turner	
THE HUBBLE SPACE TELESCOPE KEY PROJECT ON THE EXTRAGALACTIC DISTANCE SCALE. XV. A CEPHEID DISTANCE TO THE FORNAX CLUSTER AND ITS IMPLICATIONS Barry F. Madore, Wendy L. Freedman, N. Silbermann, Paul Harding, John Huchra, Jeremy R. Mould, John A. Graham, Laura Ferrarese, Brad K. Gibson, Mingsheng Han, John G. Hoessel, Shaun M. Hughes, Garth D. Illingworth, Randy Phelps, Shoko Sakai, & Peter Stetson	29
ROSSI X-RAY TIMING EXPLORER HARD X-RAY OBSERVATION OF A754: CONSTRAINING THE HOTTEST TEMPERATURE COMPONENT AND THE INTRACLUSTER MAGNETIC FIELD Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski	42
SUBSTRUCTURE IN DARK HALOS: ORBITAL ECCENTRICITIES AND DYNAMICAL FRICTION Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel	50
GALACTIC EXTINCTION FROM COLORS AND COUNTS OF FIELD GALAXIES IN WFPC2 FRAMES: AN APPLICATION TO GRB 970228 Rosa A. González, Andrew S. Fruchter, & Boris Dirsch	69
DETECTION OF SURFACE BRIGHTNESS FLUCTUATIONS IN NGC 4373 USING THE HUBBLE SPACE TELESCOPE Michael A. Pahre, Jeremy R. Mould, Alan Dressler, Jon A. Holtzman, Alan M. Watson, John S. Gallagher III, Gilda E. Ballester, Christopher J. Burrows, Stefano Casertano, John T. Clarke, David Crisp, Richard E. Griffiths, Carl J. Grillmair, J. Jeff Hester, John G. Hoessel, Paul A. Scowen, Karl R. Stapelfeldt, John T. Trauger, & James A. Westphal	79
THE MOLECULAR ISM IN LOW SURFACE BRIGHTNESS DISK GALAXIES J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh	89
ON THE STRUCTURE AND MORPHOLOGY OF THE "DIFFUSE IONIZED MEDIUM" IN STAR-FORMING GALAXIES Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert	97
HIGHLY IONIZED HIGH-VELOCITY CLOUDS: INTERGALACTIC GAS IN THE LOCAL GROUP OR DISTANT GAS IN THE GALACTIC HALO? Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy	108
A REANALYSIS OF THE ULTRAVIOLET EXTINCTION FROM INTERSTELLAR DUST IN THE LARGE MAGELLANIC CLOUD K. A. Misselt, Geoffrey C. Clayton, & Karl D. Gordon	128
ASCA AND CONTEMPORANEOUS GROUND-BASED OBSERVATIONS OF THE BL LACERTAE OBJECTS 1749+096 AND 2200+420 (BL LAC) Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry	140
SATELLITES AS PROBES OF THE MASSES OF SPIRAL GALAXIES Lance K. Erickson, S. T. Gottesman, & James H. Hunter, Jr.	153
CHEMICAL ABUNDANCES OF PLANETARY NEBULAE IN THE BULGE AND DISK OF M31 George H. Jacoby & Robin Ciardullo	169
THE CIRCUMSTELLAR EXTINCTION OF PLANETARY NEBULAE Robin Ciardullo & George H. Jacoby	191
G359.87+0.18, AN FR II RADIO GALAXY 15' FROM SAGITTARIUS A*: IMPLICATIONS FOR THE SCATTERING REGION IN THE GALACTIC CENTER	196

CONTENTS

	Page
MICROLENSING IN THE GALACTIC BULGE: EFFECTS OF THE DISK BEHIND THE BULGE Vibhat Nair & Jordi Miralda-Escudé	206
GAMMA-RAY EMISSION FROM THE INNER GALACTIC RIDGE R. L. Kinzer, W. R. Purcell, & J. D. Kurfess	215
THE EARLIEST PHASES OF GALAXY EVOLUTION Cristina Chiappini, Francesca Matteucci, Timothy C. Beers, & Ken'ichi Nomoto	226
ON THE MASS OF POPULATION III STARS Fumitaka Nakamura & Masayuki Umemura	239
A HIGH-VELOCITY MOLECULAR CLOUD NEAR THE CENTER OF THE GALAXY Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki	249
A PRECISION TEST OF HIPPARCOS SYSTEMATICS TOWARD THE HYADES Vijay K. Narayanan & Andrew Gould	256
CORRELATION BETWEEN GAS AND DUST IN MOLECULAR CLOUDS João Alves, Charles J. Lada, & Elizabeth A. Lada	265
THE MAGNETIC FIELD OF THE NGC 2024 MOLECULAR CLOUD R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss	275
CLOUDS AS TURBULENT DENSITY FLUCTUATIONS: IMPLICATIONS FOR PRESSURE CONFINEMENT AND SPECTRAL LINE DATA INTERPRETATION Javier Ballesteros-Paredes, Enrique Vázquez-Semadeni, & John Scalo	286
DETECTION OF MAGNETIC FIELDS TOWARD M17 THROUGH THE H 1 ZEEMAN EFFECT C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher	304
THE STELLAR INITIAL MASS FUNCTION FROM RANDOM SAMPLING IN HIERARCHICAL CLOUDS. II. STATISTICAL FLUCTUATIONS AND A MASS DEPENDENCE FOR STARBIRTH POSITIONS AND TIMES Bruce G. Elmegreen	323
MULTICOMPONENT X-RAY EMISSIONS FROM REGIONS NEAR OR ON THE PULSAR SURFACE $K.S.Cheng\&L.Zhang$	337
FIRST OBSERVATIONS OF AN R CORONAE BOREALIS STAR WITH THE SPACE TELESCOPE IMAGING SPECTROGRAPH: RY SAGITTARII NEAR MAXIMUM LIGHT Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund	351
THE VISUAL ORBIT OF 1 PEGASI A. F. Boden, C. D. Koresko, G. T. van Belle, M. M. Colavita, P. J. Dumont, J. Gubler, S. R. Kulkarni, B. F. Lane, D. Mobley, M. Shao, J. K. Wallace (The PTI Collaboration), & G. W. Henry	356
X-RAY NOVAE, EVENT HORIZONS, AND THE EXPONENTIAL METRIC Stanley L. Robertson	365
ON THE EVOLUTION OF STARS THAT FORM ELECTRON-DEGENERATE CORES PROCESSED BY CARBON BURNING. V. SHELL CONVECTION SUSTAINED BY HELIUM BURNING, TRANSIENT NEON BURNING, DREDGE-OUT, URCA COOLING, AND OTHER PROPERTIES OF AN 11 M_{\odot} POPULATION I MODEL STAR Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.	381
COMPETING DRIFTING RADIO SUBPULSES IN PSR B0031-07 M. Vivekanand & B. C. Joshi	398
V2301 OPHIUCHI: AN X-RAY-BRIGHT ECLIPSING AM HERCULIS OBJECT Thomas Y. Steiman-Cameron & James N. Imamura	404
A NUMERICAL STUDY OF NORMAL MODES OF ROTATING NEUTRON STAR MODELS BY THE COWLING APPROXIMATION Shin'ichirou Yoshida & Yoshiharu Eriguchi	414
THE ACTIVE CORONA OF HD 35850 (F8 V) Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel	423

CONTENTS

V

PHOTOSPHERIC MAGNETIC RECONNECTION AND CANCELING MAGNETIC FEATURES ON THE SUN Yuri E. Litvinenko	435
TIME SERIES OF SOLAR GRANULATION IMAGES. II. EVOLUTION OF INDIVIDUAL GRANULES J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier	441
1999 APRIL 20, NUMBER 2	
WEAK LENSING BY LARGE-SCALE STRUCTURE AND THE POLARIZATION PROPERTIES OF DISTANT RADIO SOURCES Gabriela C. Surpi & Diego D. Harari	455
TEMPERATURE ANISOTROPIES AND DISTORTIONS INDUCED BY HOT INTRACLUSTER GAS ON THE COSMIC MICROWAVE BACKGROUND F. Atrio-Barandela & J. P. Mücket	465
RECOVERING THE PRIMORDIAL DENSITY FLUCTUATIONS: A COMPARISON OF METHODS Vijay K. Narayanan & Rupert A. C. Croft	471
LACK OF IRON ABUNDANCE EVOLUTION IN HIGH-REDSHIFT QSOs Keith L. Thompson, Gary J. Hill, & Richard Elston	487
NO EVIDENCE FOR GAMMA-RAY BURST/ABELL CLUSTER OR GAMMA-RAY BURST/RADIO-QUIET QUASAR CORRELATIONS K. Hurley, D. H. Hartmann, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer	497
SMALL-SCALE STRUCTURE AT HIGH REDSHIFT. I. GLIMPSES OF THE INTERSTELLAR MEDIUM AT REDSHIFT ~3.5 Michael Rauch, Wallace L. W. Sargent, & Tom A. Barlow	500
A NEW MEASURE OF THE CLUSTERING OF QSO HEAVY-ELEMENT ABSORPTION-LINE SYSTEMS Jean M. Quashnock & Michael L. Stein	506
VELOCITY DISPERSION OF THE GRAVITATIONAL LENS 0957+561 John L. Tonry & Marijn Franx	512
THE CANADA-UK DEEP SUBMILLIMETER SURVEY: FIRST SUBMILLIMETER IMAGES, THE SOURCE COUNTS, AND RESOLUTION OF THE BACKGROUND Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton	518
SELF-REGULATING GALAXY FORMATION AS AN EXPLANATION FOR THE TULLY-FISHER RELATION D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin	525
A COMPARISON OF METAL ENRICHMENT HISTORIES IN RICH CLUSTERS AND INDIVIDUAL LUMINOUS ELLIPTICAL GALAXIES Fabrizio Brighenti & W. Mathews	542
CTD 93 AND THE NATURE OF GIGAHERTZ PEAKED SPECTRUM RADIO SOURCES David B. Shaffer, K. I. Kellermann, & T. J. Cornwell	558
BROADBAND X-RAY OBSERVATIONS OF THE NARROW-LINE X-RAY GALAXY NGC 5506 T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki	567
ON RADIO AND X-RAY EMISSION MECHANISMS IN NEARBY, X-RAY-BRIGHT GALACTIC NUCLEI Insu Yi & Stephen P. Boughn	576
NUCLEAR DISKS OF GAS AND DUST IN EARLY-TYPE GALAXIES AND THE HUNT FOR MASSIVE BLACK HOLES: HUBBLE SPACE TELESCOPE OBSERVATIONS OF NGC 6251 Laura Ferrarese & Holland C. Ford	583
TESTING THE RELATION BETWEEN THE LOCAL AND COSMIC STAR FORMATION HISTORIES Brian D. Fields	603
A SURVEY OF PLANETARY NEBULAE IN THE SOUTHERN GALACTIC BULGE Sylvie F. Beaulieu, Michael A. Dopita, & Kenneth C. Freeman	610
RADIO CONTINUUM AND RECOMBINATION LINE OBSERVATIONS OF THE POLYPOLAR PLANETARY NEBULA NGC 2440 Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda	633
THEORETICAL MODELING OF 1SO RESULTS ON PLANETARY NEBULA NGC 7027 M. Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman	640

CONTENTS

FAR-INFRARED AND SUBMILLIMETER OBSERVATIONS AND PHYSICAL MODELS OF THE	649
REFLECTION NEBULA CEDERBLAD 201 Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens	
THE COLLISIONS OF HIGH-VELOCITY CLOUDS WITH A MAGNETIZED GASEOUS GALACTIC DISK Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim	657
PHOTODISSOCIATION REGION MODELS OF PHOTOEVAPORATING CIRCUMSTELLAR DISKS AND APPLICATION TO THE PROPLYDS IN ORION H. Störzer & D. Hollenbach	669
THE INTERACTION OF A STRONG MAGNETIC FIELD WITH A COLD PLASMA: THE EVOLUTION OF A MAGNETIC BUBBLE William I. Newman & Alice L. Newman	685
L1448 IRS 2: A HIRES-IDENTIFIED CLASS 0 PROTOSTAR JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson	696
DUST AROUND FIRST-ASCENT RED GIANTS M. Jura	706
THE "RABBIT": A POTENTIAL RADIO COUNTERPART OF GeV J1417-6100 Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green	712
A SUBRELATIVISTIC SHOCK MODEL FOR THE RADIO EMISSION OF SN 1998bw Eli Waxman & Abraham Loeb	721
ROSSI X-RAY TIMING EXPLORER OBSERVATION OF CYGNUS X-1. III. IMPLICATIONS FOR COMPTON CORONA AND ADVECTION-DOMINATED ACCRETION FLOW MODELS Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman	726
ACCRETION DISK REVERSAL AND THE SPIN-UP/SPIN-DOWN OF ACCRETING PULSARS James R. Murray, Martijn de Kool, & Jianke Li	738
EXTREME ULTRAVIOLET EXPLORER PHOTOMETRY OF RS CANUM VENATICORUM SYSTEMS: FOUR FLARING MEGASECONDS Rachel A. Osten & Alexander Brown	746
VLA OBSERVATIONS OF THE INTERACTING-WIND BINARY SYSTEM WR 147 M. E. Contreras & L. F. Rodríguez	762
THE EFFECT OF AN ISOTHERMAL ATMOSPHERE ON THE PROPAGATION OF THREE-DIMENSIONAL WAVES IN A THERMALLY STRATIFIED ACCRETION DISK G. I. Ogilvie & S. H. Lubow	767
MAGNETOROTATIONAL INSTABILITY IN PROTOPLANETARY DISKS. I. ON THE GLOBAL STABILITY OF WEAKLY IONIZED DISKS WITH OHMIC DISSIPATION Takayoshi Sano & Shoken M. Miyama	776
TRANSPORT AND ACCELERATION OF ENERGETIC CHARGED PARTICLES NEAR AN OBLIQUE SHOCK $\it D.Ruffolo$	787
FRACTAL ANALYSIS OF MICHELSON DOPPLER IMAGER MAGNETOGRAMS: A CONTRIBUTION TO THE STUDY OF THE FORMATION OF SOLAR ACTIVE REGIONS $N.Meunier$	801
MAGNETIC AND RADIATIVE VARIABILITY OF SOLAR SURFACE STRUCTURES. I. IMAGE DECOMPOSITION AND MAGNETIC-INTENSITY MAPPING Karen L. Harvey & Oran R. White	812
ABSORPTION/EMISSION OF SOLAR p-MODES: MICHELSON DOPPLER INTERFEROMETER/SOHO OBSERVATIONS Deborah Haber, Rekha Jain, & Ellen G. Zweibel	832
THREE-DIMENSIONAL STEREOSCOPIC ANALYSIS OF SOLAR ACTIVE REGION LOOPS. I. SOHO/EIT OBSERVATIONS AT TEMPERATURES OF (1.0–1.5) × 10° K Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker	842
DETECTION OF THE METHYL RADICAL ON NEPTUNE B. Bézard, P. N. Romani, H. Feuchtgruber, & T. Encrenaz	868
STOCHASTIC ACCELERATION OF ELECTRONS BY PLASMA WAVES. III. WAVES PROPAGATING PERPENDICULAR TO THE MAGNETIC FIELD Julia M. Pryadko & Vahé Petrosian	873

ABSTRACTS OF THE ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES, 1999 MAY	Page
THE MOLONGLO REFERENCE CATALOG 1 Jy RADIO SOURCE SURVEY. IV. OPTICAL SPECTROSCOPY OF A COMPLETE QUASAR SAMPLE Joanne C. Baker, Richard W. Hunstead, Vijay K. Kapahi, & C. R. Subrahmanya	882
MULTIWAVEBAND OBSERVATIONS OF QUASARS WITH FLAT RADIO SPECTRA AND STRONG MILLIMETER-WAVE EMISSION Steven D. Bloom, Alan P. Marscher, E. M. Moore, Walter Gear, Harri Teräsranta, Esko Valtaoja, Hugh D. Aller, & Margo F. Aller	882
A SPECTROSCOPIC CATALOG OF 10 DISTANT RICH CLUSTERS OF GALAXIES Alan Dressler, Ian Smail, Bianca M. Poggianti, Harvey Butcher, Warrick J. Couch, Richard S. Ellis, & Augustus Oemler, Jr.	883
GALAXY STRUCTURAL PARAMETERS: STAR FORMATION RATE AND EVOLUTION WITH REDSHIFT M. Takamiya	883
Hubble Space Telescope Snapshot Survey of 3 CR Radio Source Counterparts. III. Radio Galaxies With z < 0.1 André R. Martel, Stefi A. Baum, William B. Sparks, Eric Wyckoff, John A. Biretta, Daniel Golombek, Ferdinando D. Macchetto, Sigrid de Koff, Patrick J. McCarthy, & George K. Miley	884
GENESIS: A High-Resolution Code for Three-dimensional Relativistic Hydrodynamics M. A. Aloy, J. M. Ibánez, J. M. Martí, & E. Müller	884
THE MOLONGLO GALACTIC PLANE SURVEY. I. OVERVIEW AND IMAGES A. J. Green, L. E. Cram, M. I. Large, & Taisheng Ye	885
A MID-INFRARED IMAGING SURVEY OF PROTO-PLANETARY NEBULA CANDIDATES Margaret Meixner, Toshiya Ueta, Aditya Dayal, Joseph L. Hora, Giovanni Fazio, Bruce L. Hrivnak, Christopher J. Skinner, William F. Hoffmann, & Lynne K. Deutsch	885
The Response of the $EUVE$ Scanning and Deep Survey Telescopes to Coronal Plasma Radiative Loss $Jeremy J. Drake$	886
SPECTROSCOPIC CONFIRMATION OF 55 NORTHERN AND EQUATORIAL CATACLYSMIC VARIABLES. I. 27 CONFIRMED CATACLYSMIC VARIABLES Wu Liu, J. Y. Hu, X. H. Zhu, & Z. Y. Li	886
SPECTROSCOPIC CONFIRMATION OF 55 NORTHERN AND EQUATORIAL CATACLYSMIC VARIABLES. II. 28 DISPROVED AND SUSPECTED CATACLYSMIC VARIABLE CANDIDATES Wu Liu, J. Y. Hu, Z. Y. Li, & L. Cao	886
Final Astro-2 Calibration of the Hopkins Ultraviolet Telescope Jeffrey W. Kruk, Thomas M. Brown, Arthur F. Davidsen, Brian R. Espey, David S. Finley, & Gerard A. Kriss	887
The A $^3\Phi$ -X $^3\Delta$ System (γ Bands) of TiO: Laboratory and Sunspot Measurements R. S. Ram, P. F. Bernath, M. Dulick, & L. Wallace	887
INDEX TO VOLUMES 513-515, PARTS 1 AND 2	i